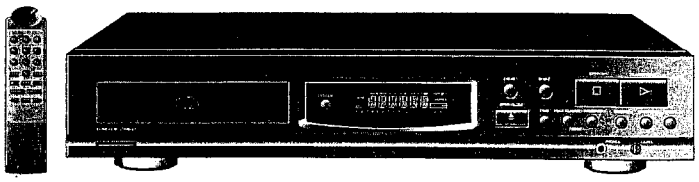
Service
Service
Service



Service Manual

For **CD721/00/01**, please refer to Service Manual CD720/00B - 4822 725 24056 02137
For **CD721/05**, please refer to Service Manual CD720/05B - 4822 725 24056
with the following differences :

1. Mechanical Changes:

1	4822 444 40831	Cabinet front
8	4822 410 63803	Button set
15	4822 450 62475	Window display
65	4822 444 30511	Cover front CD
151	4822 444 61045	Cover - /01 only
251	4822 462 42206	Foot
252	4822 462 42206	Foot
253	4822 462 42206	Foot
254	4822 462 42206	Foot
308	4822 321 22832	Cinch cable assy - /01 only
365	4822 218 10538	Remote control
	4822 736 22461	DFU (multi language)
	4822 736 22467	DFU (GB-F-E-C) - /01 only

Delete : 283 - /01 only

2. Electrical Changes:

3708 change to 3725	4822 050 11002	1k 5% 0.4W
9062 change to 3726	4822 050 11002	1k 5%
9034 change to 3727	4822 050 11002	1k 5%
9069 change to 2506	4822 126 12882	100nF +80%-20% 50V

Delete : 2109, 2112, 2118, 3112, 3116, 3707.

Add	2113	4822 122 33191	22pF 5% 50V
	5500	4822 146 21796	Transformer - /01 only

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PCS 83 239

PHILIPS

Compact disc player CD710/00B/05B

CD720/00B/01B/05B

Service

ServiceManual

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P(S 60 664

Compact disc

New key components of CD94 program
CD6 Decoder SAA7345
CC_DAC TDA1545
BCC-DAC TDA1549

Service
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Service

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TECHNICAL SPECIFICATIONS

General

1.Mains voltage	/00B	: 230V (+6 -10%)
	/05B	: 240V (±10%)
	/01B	:110V-127V/220V-240V
2.Mains frequency		: 50-60 Hz
3.Mains voltage selection only	/01B	: Voltage selector 2 positions
4.Power consumption mains	standby	: < 3W
	operated	: < 10W

Remote Control(only CD720)

Internal: RC5

Line output

1.Number of channels	: 2
2.Output voltage	: 2 Vrms ± 3 dB
3.Output resistance	: 1 kΩ
4.Dynamic range (-60 dB)	: min. 84 dB from 20 Hz to 20 kHz
5.Unbalance left-right	: max. 1 dB
6.Channel separation	: min. 82 dB from 20 Hz to 20 kHz
7.Signal to noise ratio	: min. 83 dB from 20 Hz to 20 kHz
8.Total harmonic distortion + noise	: min. 70 dB from 20 Hz to 20 kHz
9.Frequency response	: max. ± 0.5 dB from 20 Hz to 20 kHz
10.Phase non-linearity	: max 7.0° from 20 Hz to 16 kHz
11.Automatic switched deemphasis with time constant 15/50 µs	
12.Out-band attenuation	: min. 35 dB (above 40 kHz)

Variable headphone(only CD720) (low end)

1.Output voltage	: max. 5 Vrms ± 3dB
2.Unbalance left-right	: max. ± 1.2 dB
3.Output resistance	: 120 Ω
4.Load impedance range	: 30 Ω to 600 Ω
5.Output power	: 0 to 30 mW into 30 Ω load
	: 0 to 50 mW into 150 Ω load
	: 0 to 30 mW into 600 Ω load

Audio specs in case of 600 Ω load at 4 Vrms voltage output

6.Signal to noise ratio	: min. 80 dB
7.Dynamic range	: min. 70 dB (20 Hz -20 kHz)
8.Total harmonic distortion	: min. 60 dB (20 Hz - 20 kHz)
9.Channel separation	: min. 70 dB (1 kHz)
	: min. 65 dB (31.5 Hz - 16 kHz)

Dimensions and weight

1.Apparatus tray closed	: WxDxH 435 x 260 x 74/90 mm
2.Apparatus tray open	: WxDxH 435 x 405 x 74/90 mm
3.Weight	: 3 kg

Optical read-out system

1.Laser type	: Semiconductor AlGaAs
2.Wavelength	: 780 nm ± 20 nm
3.Light output (c.w.)	: max. 0.5 mW

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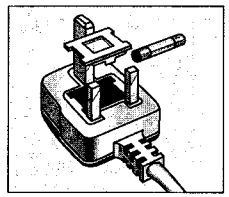
INSTALLATION

FITTING A MAINS PLUG *(U.K. only)*



This apparatus is fitted with an approved moulded 13 Amp plug. To change a fuse in this type of plug proceed as follows:

- Remove fuse cover and fuse.
- Fix new fuse which should be a BS1362 5A, A.S.T.A. or BSI approved type.
- Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.

If the mains plug contains a fuse, this should have a value of **5A**. If a plug without a fuse is used, the fuse at the distribution board should not be greater than **5A**.

NOTE

The severed plug must be disposed to avoid a possible shock hazard should it be inserted into a 13A socket elsewhere.

HOW TO CONNECT A PLUG

The wires in the mains lead are coloured in accordance with the following code:
BLUE – "NEUTRAL" ("N") and BROWN – "LIVE" ("L").
As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:

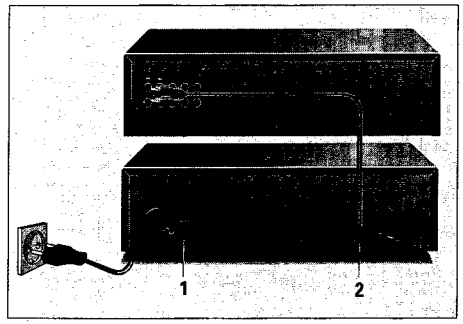
- The BLUE wire must be connected to the terminal which is marked with the letter "N" or coloured BLACK.
- The BROWN wire must be connected to the terminal which is marked with the letter "L" or coloured RED.
- Do *not* connect either wires to the earth terminal in the plug which is marked by the letter "E" or by the safety earth symbol or coloured green or green-and-yellow.

Before replacing the plug cover, make certain that the cordgrip is clamped over the sheath of the lead – not simply over the two wires.

POWER SUPPLY SETTING

- Check that the type plate at the bottom of your player indicates the correct supply voltage.
- If your mains supply voltage is different, consult your dealer or our Service Organisation.
- *Certain versions of this player are equipped with a voltage selector at the bottom of the player which enables you to set the player to the correct mains voltage yourself.*
  Position 120 V: for all mains voltages between 110V and 127 V.
  Position 230 V: for all mains voltages between 220V and 240 V.

CONNECTIONS



1 Mains connection

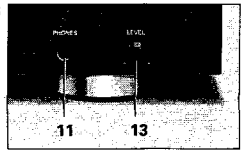
- Connect the mains lead to your mains supply.

2 Connecting cable to the amplifier

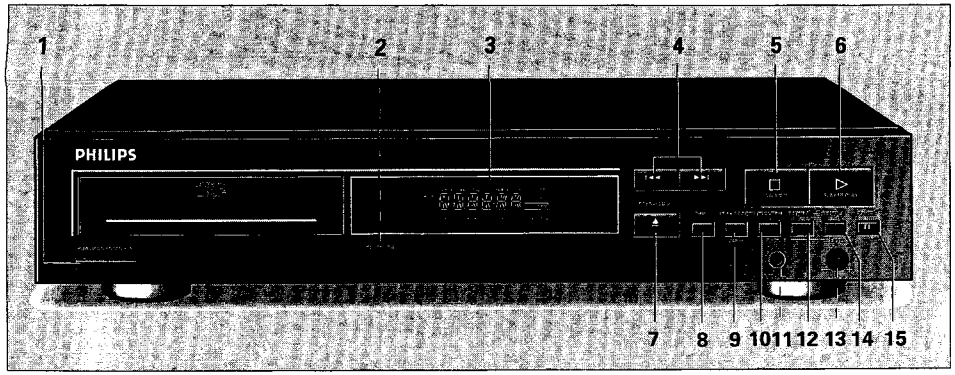
- Insert the red plug (right channel) and the white plug (left channel) into the corresponding sockets of the CD or AUX input of your amplifier. You can also use the TUNER or TAPE IN-connection, but ***never*** the PHONO input!

CONNECTING HEADPHONES *(CD720 only)*

- Connect headphones with a 6.3 mm jack plug to the PHONES socket ***11***.
- The sound level is adjusted with the LEVEL control ***13***.



FUNCTIONAL OVERVIEW



FRONT OF PLAYER

1 POWER ON/STANDBY – Switching on and off.

2 I(nfra) **R**(ed) **SENSOR** ***(CD720 only)***
Receives the signals from the remote control.

3 Display – Informs you about the functioning of the player.

4 ⏮ and ⏭
- Selecting another track.
- Selecting a track to start play with.
- Fast search to a particular passage during play.

5 STOP/CP
- Stopping play.
- Erasing a programme (CP = Clear Programme).

6 PLAY/REPLAY
- Starting play.
- Returning to the beginning of a track.

7 OPEN/CLOSE – Opening and closing the CD compartment. The compartment also closes when the front is pressed briefly.

8 TIME – Selecting the time information you want to see.

9 PEAK SEARCH – Searching the loudest passage (peak) on a CD or in a programme when making a tape recording.
FADER – Fading in and out during play.

10 PROGRAM
- Opening the memory when compiling a programme.
- Storing tracks in a programme.

11 PHONES ***(CD720 only)***
Connecting headphones.

12 REPEAT – Repeating play.

13 LEVEL (CD720 only) – *Adjusting the volume when listening with headphones.*

14 SHUFFLE – Playback in random order.

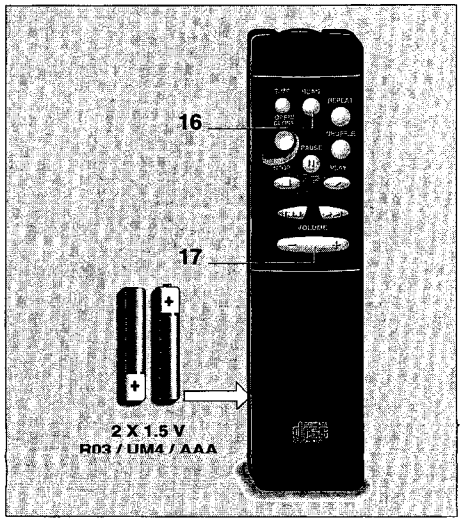
15 PAUSE – Interrupting play.

REMOTE CONTROL *(CD720 only)*

- The life of the batteries of the remote control is around one year. For replacement only use batteries of the type RO3, UM4 or AAA.
- The buttons on the remote control have the same functions as the corresponding ones on the player.
- Extra buttons:

16 SCAN – Automatically playing the beginning of each track.

17 – VOLUME + – Adjusting the sound level when the player is connected to an amplifier or HiFi system without its own remote control.



DISPLAY

PAUSE
Lights up when play is interrupted.

(((O *(CD720 only)*
Lights up when the player receives a command from the remote control.

TRACK – Indicates:
- what track is being played;
- the number of tracks on the CD or in a programme.

PEAK
- Flashes when the loudest passage (peak) on a CD or in a programme is being searched.
- Lights up when the loudest passage (peak) has been found.

TRACK TIME
Indicates the elapsed playing time of the track being played.

REM(aining) **TRACK TIME**
Indicates the remaining playing time of the track being played.

TOTAL REM(aining) **TIME**
Indicates the remaining playing time of the CD or a programme.

TOTAL TIME
Indicates the total playing time of the CD or a programme.

REPEAT
Lights up when you repeat a CD or a programme.

REPEAT 1
Lights up when you repeat a track.

SHUFFLE
Lights up when the tracks are played in random order.

PROGRAM
- Flashes when a programme is being compiled.
- Lights up when a programme has been stored in the player memory.

1-15 track number indicator
Shows the number of tracks on the CD.

+
Lights up when there are more than 15 tracks on the CD.

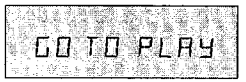
DISPLAY MESSAGES

Lights up when the CD's contents list is being scanned.

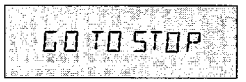
Lights up when there is no CD in the CD compartment.

Scrolls on the display when insert a non audio CD (CD-ROM, CD-I or CDV).

Scrolls on the display if you select a non-existent track number.



Scrolls on the display if you try to activate a function for which you must first start play.



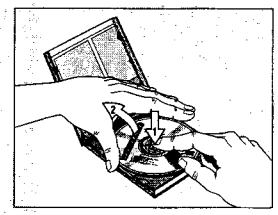
Scrolls on the display if you try to activate a function for which you must first stop play.

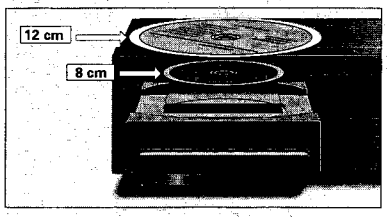
PLAYBACK

NORMAL PLAYBACK (PLAY/REPLAY)

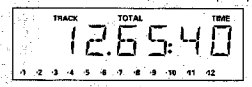
NOTE! *Use only audio CDs; no CD-ROM, CD- I or CDV.*

- Press POWER ON/STANDBY ***1*** to switch the player on.
- Open the CD compartment by pressing OPEN/CLOSE ***7***.
  – *OPEN* lights up.
- Insert an audio CD, ***printed side up***, and close the compartment by pressing OPEN/CLOSE ***7***.

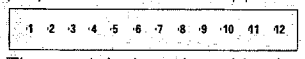


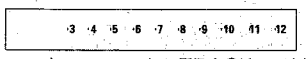


– *CLOSE* lights up, followed by *READ*. The number of tracks and the playing time of the CD are shown on the display.

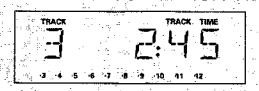


- Press PLAY/REPLAY ***6*** to start play.
  You can also press PLAY/REPLAY immediately after inserting the CD; the compartment then closes automatically.
  You can also close the CD compartment by pressing its front; playback will then start automatically.
  – The number indicator shows how many tracks are on the CD; when a track has been played its number disappears.



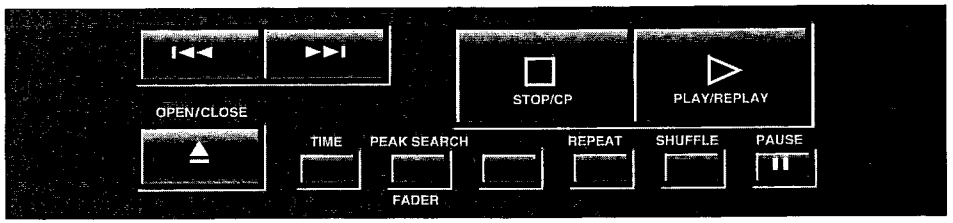


  – The track being played is always shown under TRACK and its elapsed playing time is shown under TRACK TIME.



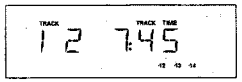
  – Play will stop after the last track.
- Press POWER ON/STANDBY ***1*** to switch the player off.

You can interrupt playback by pressing PAUSE ***15*** ; PAUSE then lights up.
Press PLAY/REPLAY ***6*** to restart; if you *first* press PAUSE again and *then* PLAY/REPLAY, the current track starts again from the beginning.
You can also restart play by pressing SCAN ***16*** *(on the remote control - **CD720 only**)* or SHUFFLE ***14***.
If you press PLAY/REPLAY during play, the current track starts again from the beginning.
You can stop playback by pressing STOP/CP ***5*** or OPEN/CLOSE ***7***.



SELECTING ANOTHER TRACK (|◄◄ ►►|)

- Press ►►| ***4*** or |◄◄ ***4*** *(less than 0.5 seconds)* untill the desired track number appears under TRACK.



  – The music stops and a moment later the selected track begins to play.

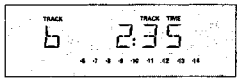
SEARCHING FOR A PASSAGE (|◄◄ ►►|)

- Hold |◄◄ ***4*** down to search backwards to the beginning.
- Hold ►►| ***4*** down to search forwards to the end.

The searching speed is determined by how long a key is pressed:
– the first 2 seconds fairly slowly, with sound;
– then at the maximum speed, with no sound.
If you reach the end of the last track and release ►►|, play will resume a few seconds before the end of the CD.

STARTING WITH A PARTICULAR TRACK (|◄◄ ►►|)

- Press ►►| ***4*** or |◄◄ ***4*** *(less than 0.5 seconds)* untill the desired track number appears under TRACK.



- Press PLAY/REPLAY ***6***.
  – Play starts from the selected track.

PLAYING THE CD IN RANDOM ORDER (SHUFFLE)

- Press SHUFFLE ***14*** before or during play.
  – If the CD compartment was open, it will now close.
  – SHUFFLE lights up and all the tracks are now played in a random order.

- Press SHUFFLE again if you wish to return to normal play.

If you press |◄◄ ***4***, you will return to a track which has already been played.
If you press ►►| ***4***, you will select any one of the following tracks.
If you press REPEAT ***12***, *twice* the tracks will be repeated in a different order each time, although the first track played will always be the same.

REPEATING PLAY (REPEAT)

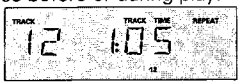
Repeating a track:

- Press REPEAT ***12*** before or during play.
  – REPEAT 1 lights up; the track will now be repeated continuously.

- Press REPEAT *twice* to stop the track being repeated.

Repeating the CD:

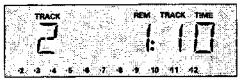
- Press REPEAT ***12*** *twice* before or during play.
  – REPEAT lights up; the CD will now be repeated continuously.



- Press REPEAT again to stop the CD being repeated.

CALLING UP OTHER TIME INFORMATION (TIME)

- Press TIME ***8*** whenever you want to know the remaining playing time of the track being played (REM TRACK TIME).



- Press TIME again if you wish to know the remaining playing time of the entire CD (TOTAL REM TIME).

- Press TIME again if you wish to return to the elapsed playing time indication of the current track (TRACK TIME).

PLAYBACK

SEARCHING THE LOUDEST PASSAGE (PEAK SEARCH)

- *In STOP mode*, press PEAK SEARCH ***9***.
- PEAK starts flashing and the CD or the programme will now be scanned for the loudest passage (the peak).

- The display shows the track being scanned and its elapsed playing time.
- When the loudest passage has been found it will be repeated continuously (from 2 seconds before the peak until 2 seconds after the peak)

- You can now adjust your recording device.
- You can stop the search by pressing STOP/CP ***5*** or OPEN/CLOSE ***7***; if you press PLAY/REPLAY ***6***, the CD or the programme will be played from the beginning.

SETTING THE FADE- IN AND FADE-OUT TIME (FADER)

- *During play* press FADER ***9***.
- The sound level will now gradually decrease (FADE OUT), after which the player will go into the PAUSE mode.

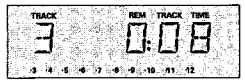
- Press FADER again.
- Play continues and the sound level will increase again to the originally set level (FADE IN).

NOTE!

The following functions can only be operated using the remote control ***(CD720 only)***.

SCANNING A CD (SCAN)

- Press SCAN ***16*** before or during play.
- If the CD compartment was open, it will now close.
- *SCAN* lights up for 2 seconds and the first 10 seconds of each track are played in turn; 10 seconds are counted down each time under REM TRACK TIME.



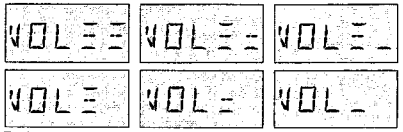
- When the player reaches a track which you wish to hear in full, press SCAN again or PLAY/REPLAY ***6***.

ADJUSTING THE SOUND LEVEL (– VOLUME +)

NOTE!

- Use the – VOLUME + keys only if the player is connected to an amplifier or HiFi system *without* its own remote control.
- The setting chosen with – VOLUME + will be cancelled when the player is switched off.

- Hold – VOLUME ***17*** pressed down.
- *VOL* lights up; the output signal from the player will now decrease gradually.
- The successive steps are shown on the display.



- Release the key as soon as the required sound level is obtained.
- Hold VOLUME + ***17*** pressed down.
- *VOL* lights up; the output signal will now increase again gradually to the maximum level.
- The successive steps are shown on the display.

- Release the key as soon as the required sound level is obtained.

PROGRAMMING

STORING A PROGRAMME (PROGRAM and |◄◄ ►►|)

You can store 30 tracks from each CD in any required sequence in a programme. *FULL* lights up if you exceed the maximum of 30 tracks.

- In STOP mode, press PROGRAM ***10*** to open the memory.
- *PROGR* lights up and PROGRAM starts flashing.
- Press ►►| or |◄◄ ***4*** *(less than 0.5 seconds)* untill the first desired track number appears under TRACK.

- Press PROGRAM ***10*** again.
- The track number has now been stored in the player's memory.
- Select the other track numbers required and store each track by pressing PROGRAM.
- The number of tracks and the playing time of your programme will be shown under TRACK and TOTAL TIME.

- The track number indicator always shows which numbers have been stored.

PLAYING THE PROGRAMME (PLAY/REPLAY)

- Press PLAY/REPLAY ***6***.
- Playback starts with the first number of the programme.

All keys (except PROGRAM ***10*** and PEAK SEARCH ***9***) can be used during programmed play.
Search for a particular passage is only possible within the track being played.

ERASING A PROGRAMME (STOP/CP or OPEN/CLOSE)

During play:

- Press OPEN/CLOSE ***7*** or STOP/CP ***5*** *(twice)*.

In STOP mode:

- Press OPEN/CLOSE ***7*** oror STOP/CP ***5*** *(once)*.

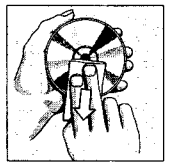
- The programme has now been erased.

ADDITIONAL INFORMATION

MAINTENANCE

The CDs

- Never write on the printed side of a CD.
- Do not attach any stickers to the CD.
- Keep the shiny surface of the of the disc clean.
  Use a soft lint-free cloth and always wipe the disc in a straight line from centre to edge.



- Never use cleaning agents for conventional records.
- Detergents or abrasive cleaning agents should not be used either.

The player

- A chamois leather slightly moistened with water is sufficient for cleaning the player.
- Do not use cleaning agents containing alcohol, spirits, ammonia or abrasives.

RECYCLING

Please observe the local regulations regarding the disposal of packing materials, exhausted batteries and old equipment.

1. All redundant packaging material has been omitted. We have done our utmost to make the packaging easy separable into three mono-materials:
   - cardboard (box)
   - expandable polystyrene (buffer)
   - polyethylene (bags, protective foam sheet)
2. Your set consists of materials which can be recycled if disassembled by a specialized company.
3. Do not dispose of exhausted batteries with your household waste.

TECHNICAL DATA

Typical Audio Performance

Frequency range: ..... 2 Hz - 20 kHz
Amplitude linearity: ..... 0.3 dB (20 Hz - 20 kHz)
Phase linearity: ..... 4° (20 Hz - 20 kHz)
Dynamic range: ..... 90 dB (1kHz)
Signal-to-noise ratio: ..... 90 dB (1 kHz,)
Channel separation: ..... 90 dB (1kHz)
Total harmonic distortion: 0.003% (1kHz)
Audio output level: ..... 2 Vrms
Impedance PHONES socket ***(CD720 only)***:
..... 30 - 600 ohms

Power supply

Mains voltage and frequency:
see the type plate on the rear of the player
Power consumption: ..... < 10 W approx.
Safety requirements: ..... IEC 65

Cabinet

Material/finish: ..... metal and polystyrene
Dimensions (w x h x d): ..... 435 x 90 x 300 mm
Weight: ..... 4 kg approx.

Subject to modification

This Compact Disc player complies with radio interference requirements as laid down in EC regulations.

TROUBLESHOOTING

If a fault occurs, run through the points listed below before taking your player for repair.
If the fault remains, try to clear it by switching the player off and on again. If this also fails to help, consult your dealer.
Under no circumstances should you repair the player yourself as this will invalidate the guarantee!

SYMPTOM	POSSIBLE CAUSE	REMEDY
– Playback of the CD does not start or interruption of playback.	– The CD has been loaded upside down. – No CD inserted. – The CD is badly scratched or dirty. – Moisture condensation on the lens.	• Reload the CD, label side up. • Insert a CD, label side up. • Clean the CD with a soft, lint-free cloth. • Leave the CD player in a warm environment until the moisture evaporates.
– Sound skips (at the same part).	– The CD is dirty.	• Clean the CD with a soft, lint-free cloth.
– The CD skips tracks.	– The CD is damaged or dirty.	• Replace or clean the CD.
– Playback does not start from the first track.	– PROGRAM or SHUFFLE activated.	• Switch off SHUFFLE or clear programme.
– No sound or bad sound.	– Loose or wrong connections. – Strong magnetic fields near the CD player.	• Check connections. • Find another place for the unit or change connections.
– No sound or bad sound on headphones ***(CD720 only)***.	– Level control set to – position. – Headphones plug is dirty.	• Set level control • Clean plug.
– Remote control does not function ***(CD720 only)***.	– Batteries are empty.	• Replace the batteries.
– Remote control commands are not properly received ***(CD720 only)***.	– The distance between remote control and CD player is larger than 10 metres.	• Use remote control receiver EM 2200/2201. • Reduce the distance between remote control and CD player.

ESD

(GB) **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

(NL) **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) **ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) **WARNUNG**

Alle ICs und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgfältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern. Sorgen sie dafür, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind. halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(I) **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden für Reparaturen sind Original-Ersatzteile zu verwenden.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde worden toegepast.

(I)
Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiago identici a quelli specificati.

(F)
Les normes de sécurité exigent que l'appareil soit remîs à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

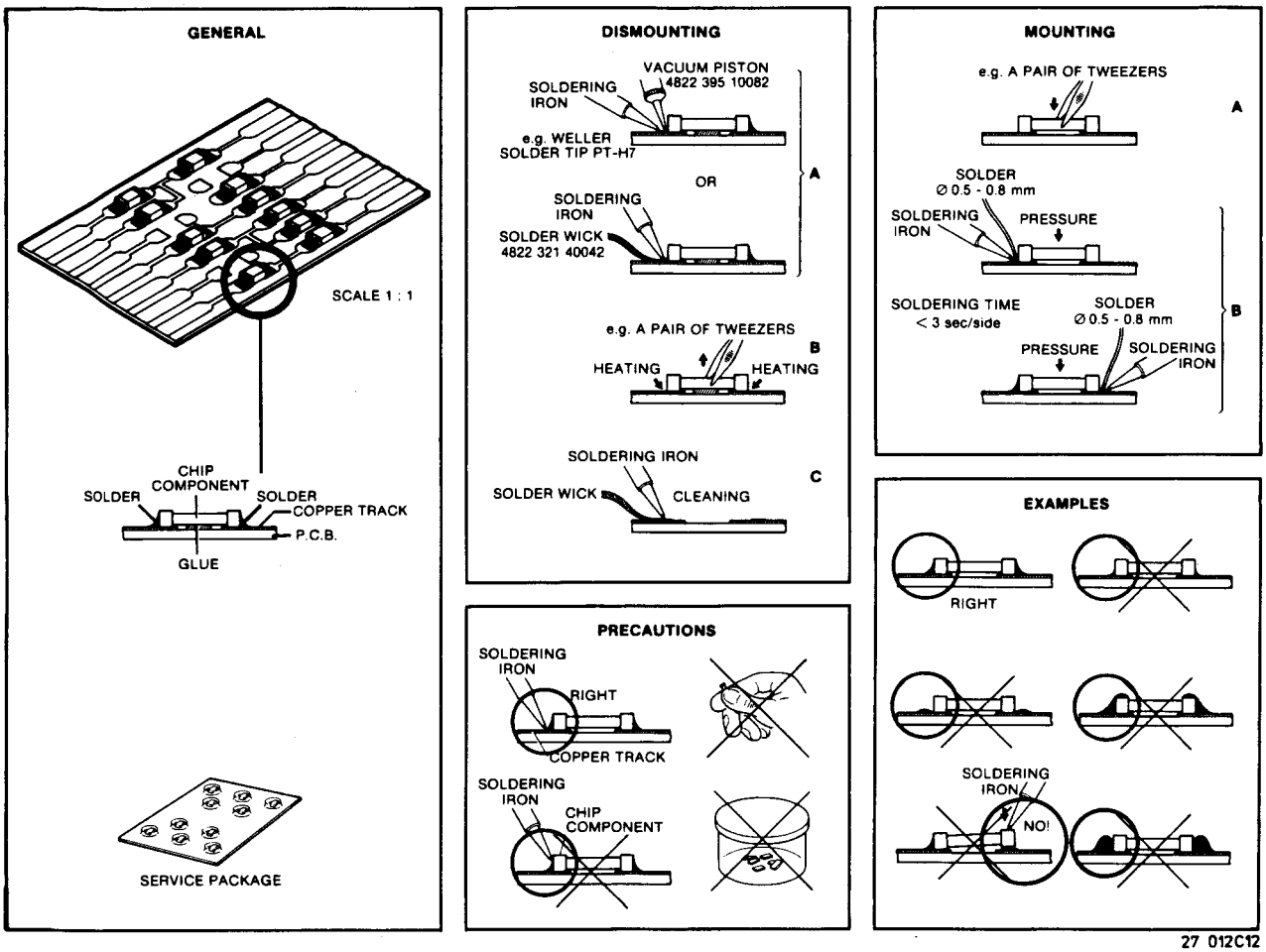
CLASS 3B
LASER PRODUCT

CAUTION INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
VARO! AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASER SÄTTEILYLLE ÄLÄ KATSO SÄTEESEN
VARNING OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
ADVERSEL USYNLIG LASERSTRÅLING VED ÅBNING. UNDGÅ UNSAETTELSE FOR STRÅLING
DANGER INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
VORSICHT UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne"

SERVICING HINTS

In the set chip components have been applied. For disassembly and assembly of chip components see the figure below.



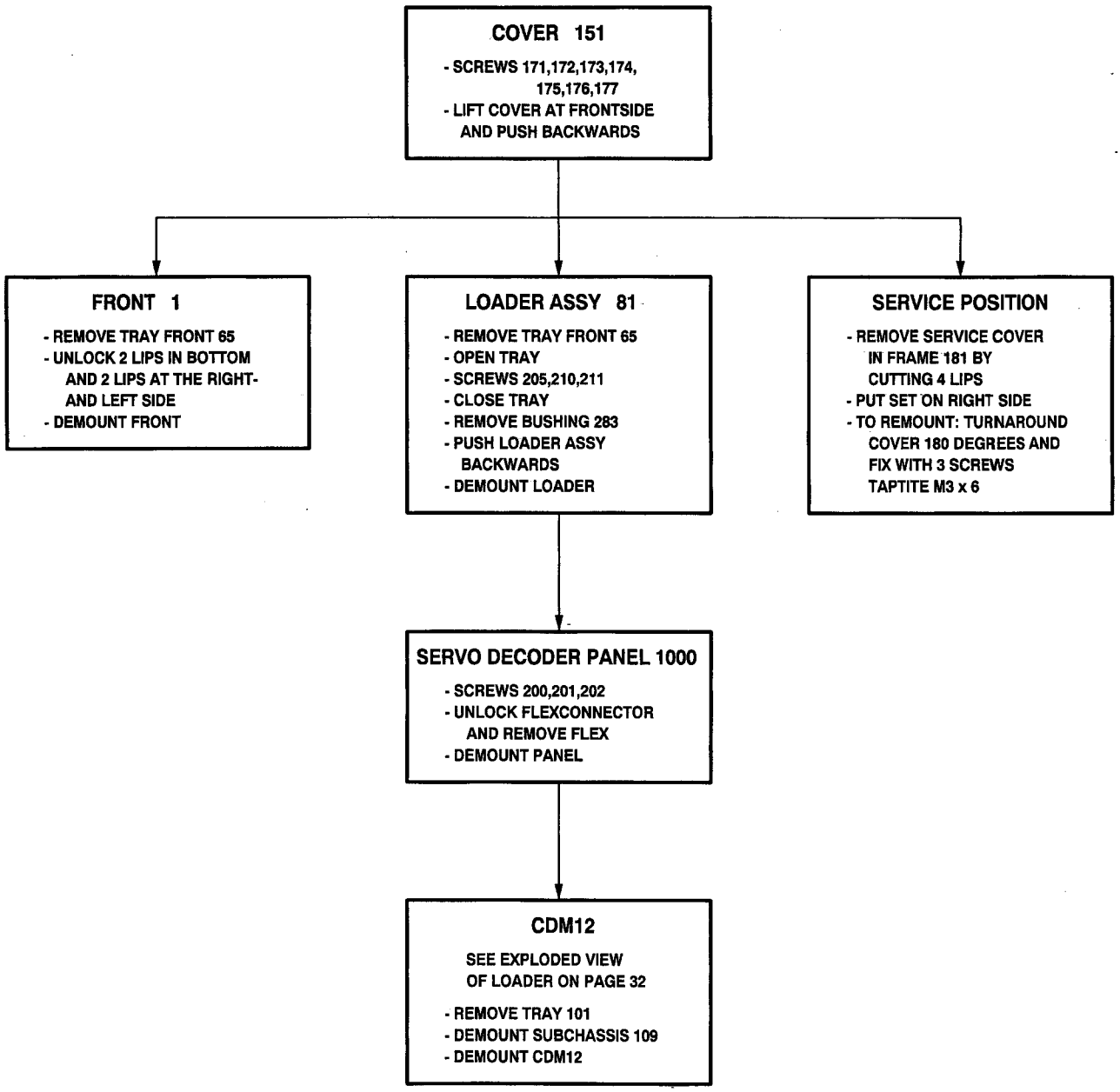
27 012C12

SERVICE TOOLS

Audio signal disc	4822 397 30184
Disc without errors (test disc 5) + disc with DO errors, black spots and fingerprints (test disc 5A	4822 397 30096
Disc (65 min 1kHz)without pause	4822 397 30155
Max. diameter disc (58.0 mm)	4822 397 60141
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204

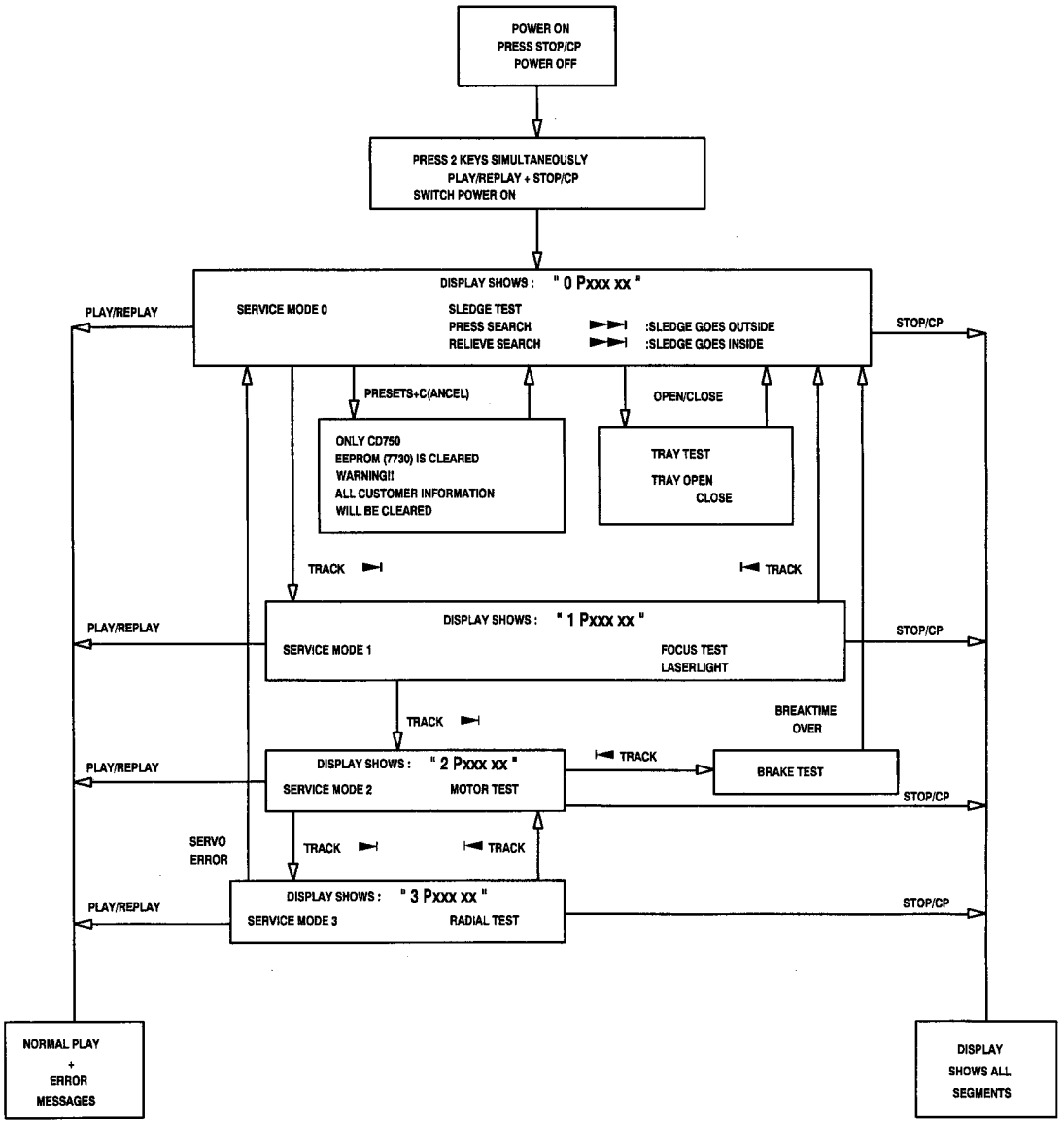
DISMANTLING INSTRUCTIONS

OPEN EXPLODED VIEW ON PAGE 33


COVER 151
- SCREWS 171,172,173,174, 175,176,177
- LIFT COVER AT FRONTSIDE AND PUSH BACKWARDS
FRONT 1
- REMOVE TRAY FRONT 65
- UNLOCK 2 LIPS IN BOTTOM AND 2 LIPS AT THE RIGHT- AND LEFT SIDE
- DEMOUNT FRONT
LOADER ASSY 81
- REMOVE TRAY FRONT 65
- OPEN TRAY
- SCREWS 205,210,211
- CLOSE TRAY
- REMOVE BUSHING 283
- PUSH LOADER ASSY BACKWARDS
- DEMOUNT LOADER
SERVICE POSITION
- REMOVE SERVICE COVER IN FRAME 181 BY CUTTING 4 LIPS
- PUT SET ON RIGHT SIDE
- TO REMOUNT: TURNAROUND COVER 180 DEGREES AND FIX WITH 3 SCREWS TAPTITE M3 x 6
SERVO DECODER PANEL 1000
- SCREWS 200,201,202
- UNLOCK FLEXCONNECTOR AND REMOVE FLEX
- DEMOUNT PANEL
CDM12
SEE EXPLODED VIEW OF LOADER ON PAGE 32
- REMOVE TRAY 101
- DEMOUNT SUBCHASSIS 109
- DEMOUNT CDM12

HAS1124
9345

SERVICE TEST PROGRAM



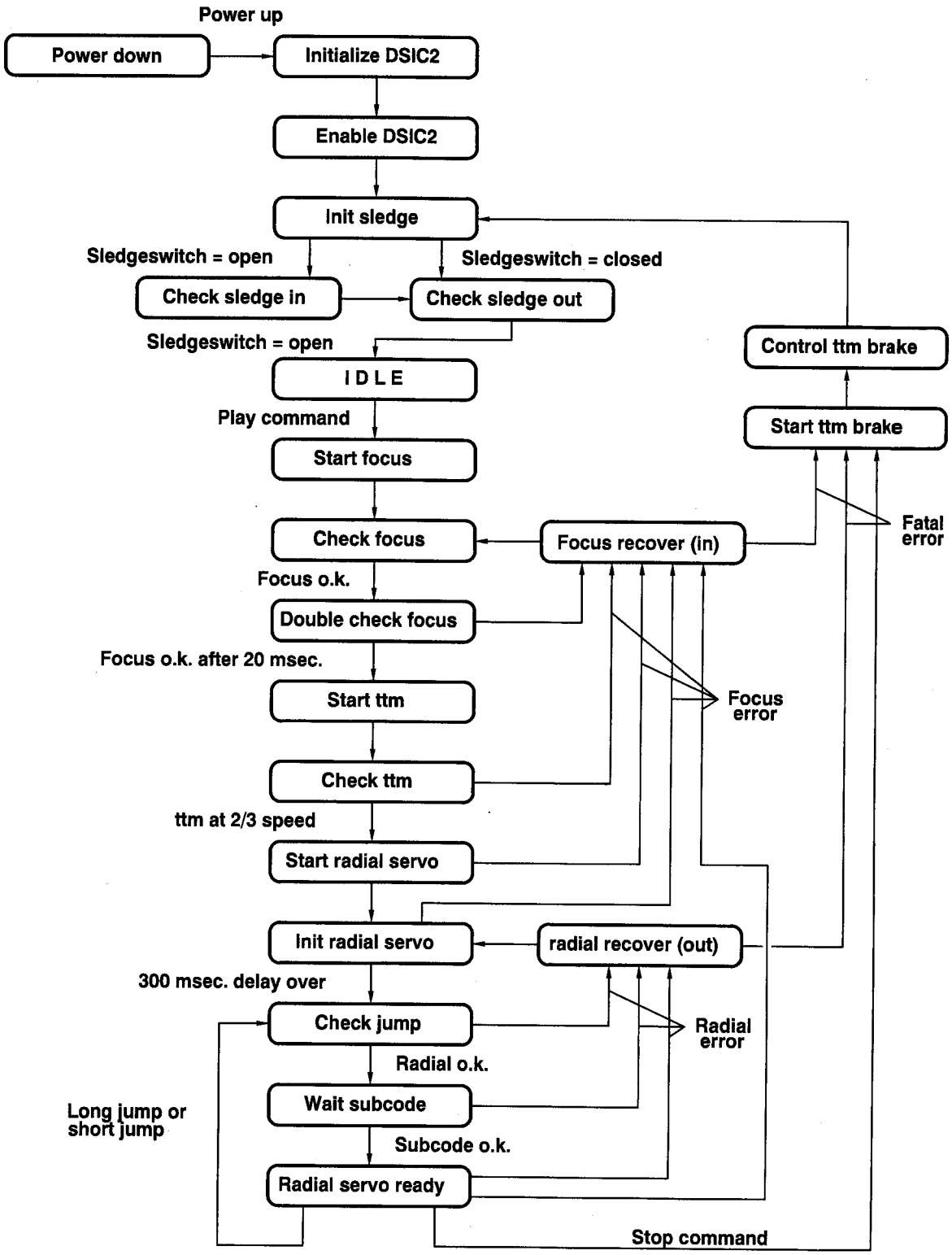
HAS1120
9342

ERROR MESSAGES

-"SLEDGE ERROR"
-"FOCUS ERROR"
-"RADIAL ERROR"
-"MOTOR ERROR"
-"EEP ER"
-"EEP OK"

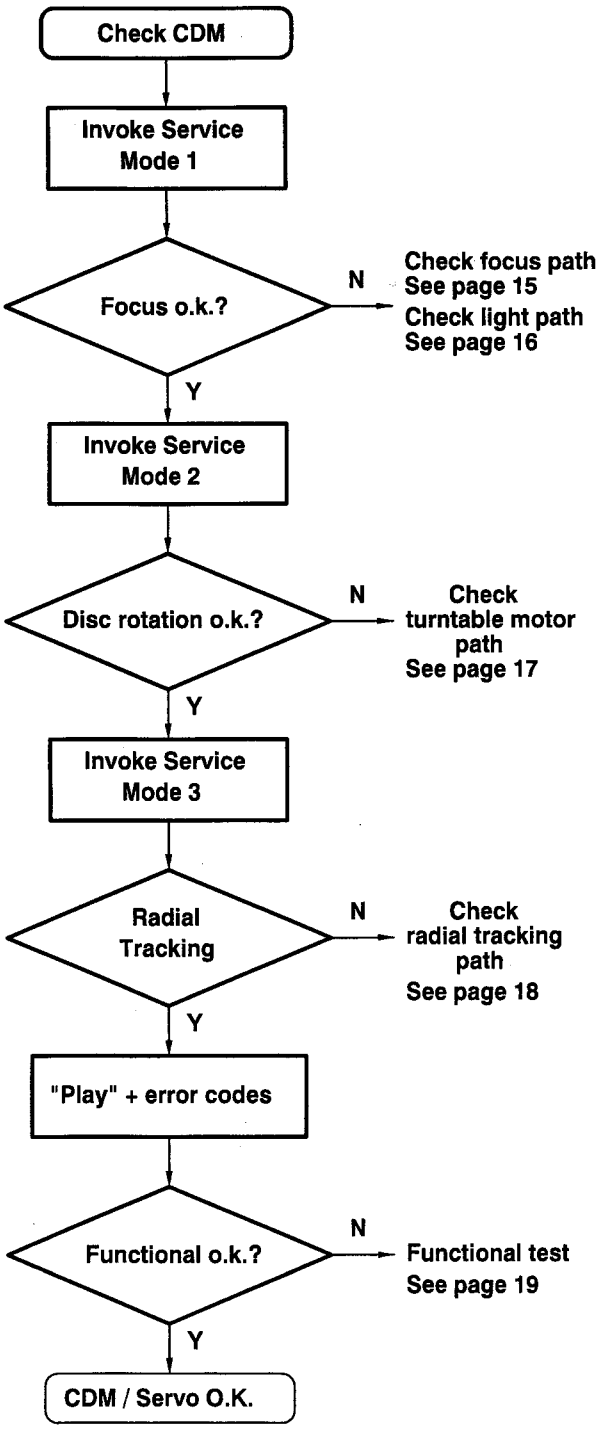
Pxxx = PROGRAM OF MICROPROCESSOR
xx = VERSION OF PROGRAM

CDM 12.1 start up diagram.



FAULT FINDING GUIDE CDM 12.1

Main Fault Finding Guide CDM 12.1
System



Listen to kind of "scratching sound" while slowly turning the disc by hand.

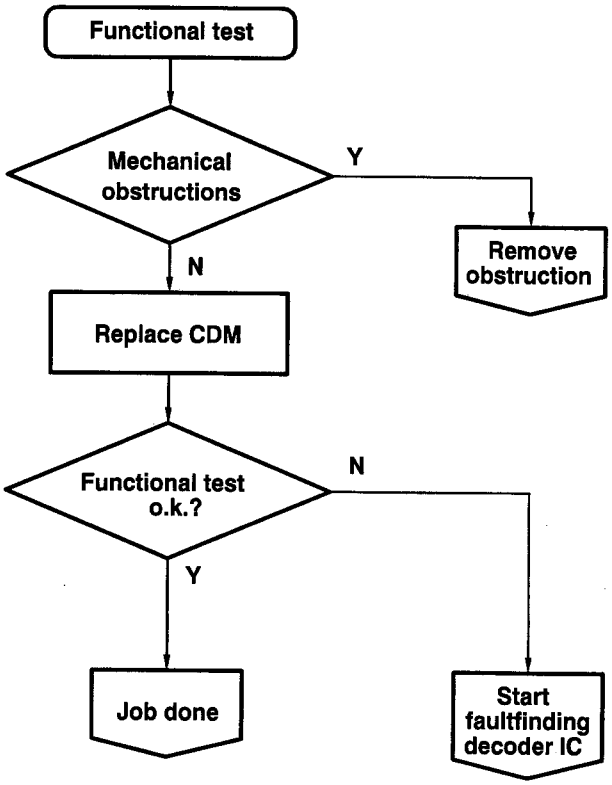
Disc is turning clock wise at normal speed.

Activity on RAD+
(pin 4 connector 1052)

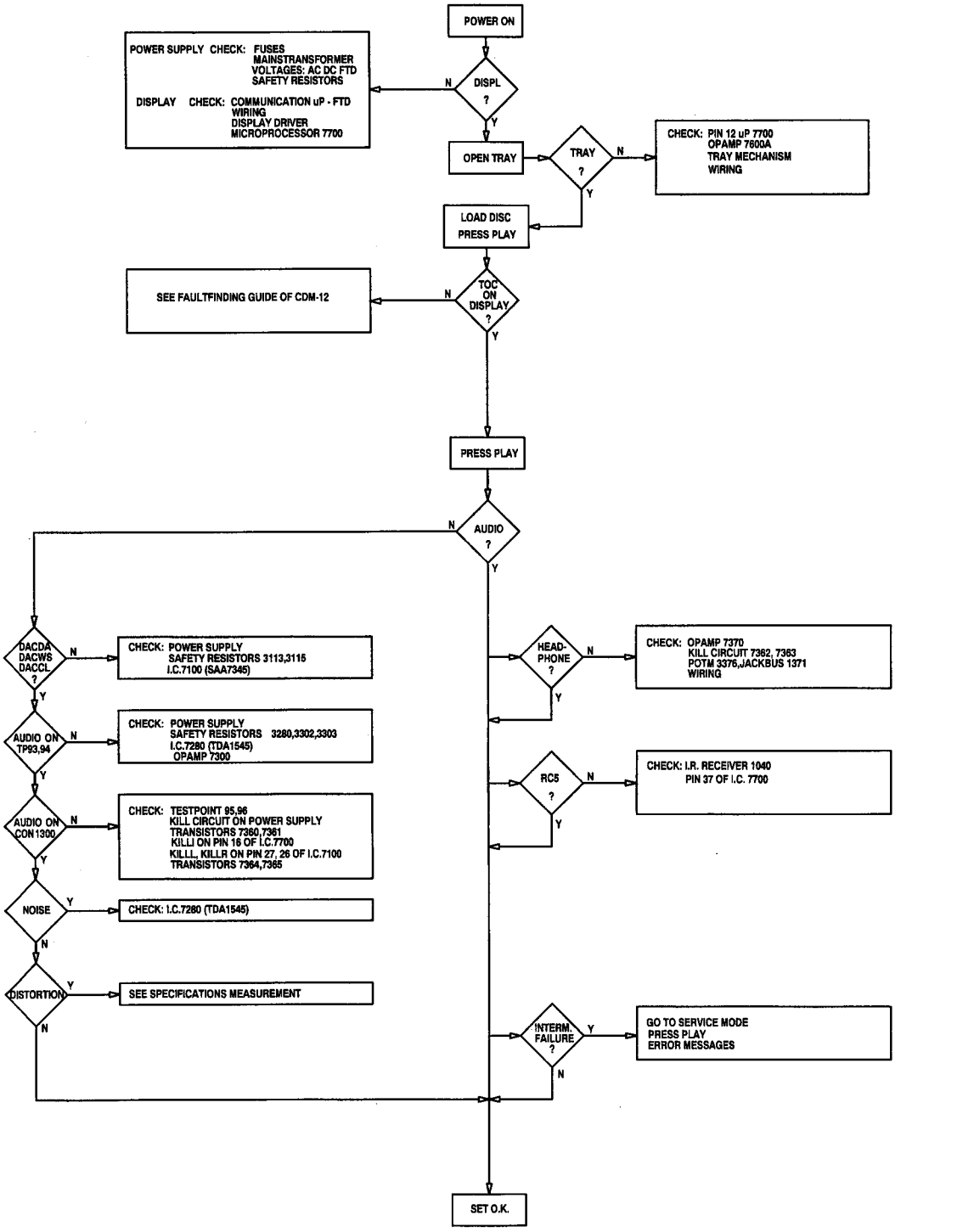
*After "play" starts at track 1 at time 0:00.
*Go to outer track and start again at time 0:00 after max. 6 seconds.

*Try search function.

*When going from "Pauze" to "play" music has to restart at the same place.


Functional test
Mechanical obstructions
Y
Remove obstruction
N
Replace CDM
Functional test o.k.?
N
Y
Job done
Start faultfinding decoder IC

FAULTFINDING GUIDE

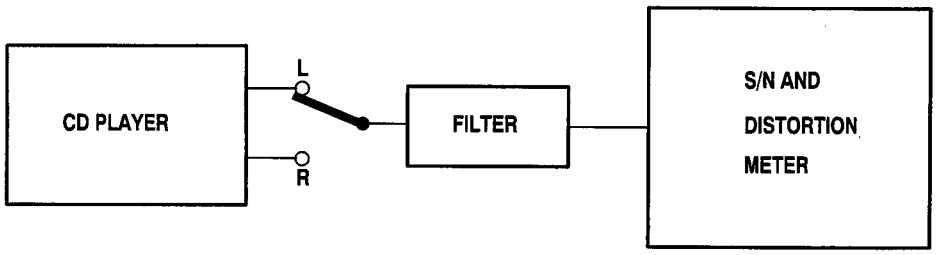


HAS1123
9345

SPECIFICATIONS MEASUREMENT

SIGNAL	AUDIO SIGNALS DISC 1	TESTPOINT	REMARKS
ANALOG OUT LEFT	TOTAL HARMONIC DISTORTION TRACKS 10 - 23	FILTER OUTPUT	SEE TECHNICAL DATA
ANALOG OUT RIGHT			SEE DRAWING
ANALOG OUT LEFT	SIGNAL-TO-NOISE RATIO TRACK 1 REFERENCE LEVEL TRACK 49	FILTER OUTPUT	SEE TECHNICAL DATA
ANALOG OUT RIGHT			SEE DRAWING

FILTER = 13TH ORDER FILTER 4822 395 30204



e.g. SOUND TECHNOLOGIE ST1700B

ABBREVIATIONS

BCK	Bit clock input of CC-DAC TDA1545
CFLG	correction flag output
CL	interface clock input line
CL11	11.2896 MHz clock output
CL16	16.9344 MHz system clock output
CLA	4.2336 MHz microprocessor clock output
CLO	Clock output
CRIN	crystal/resonator input
CROUT	crystal/resonator output
D1-D4	Central diode input of TDA1301
D1-D5	Photodiode signals from CDM12 mechanism
DA	interface data I/O line
DACCL	Bit clock output of CD6 decoder SAA7345
DACDA	Data output of CD6 decoder SAA7345
DACWS	Word select output of CD6 decoder SAA7345
DATA	serial data output/Data input of CC-DAC TDA1545
DOBM	biphase mark output
FO	Focus actuator output
FOC+	+Connection of focus actuator
FOC-	Ground connection of focus actuator
HF	High-Frequency signal to decoder input
HFIN	comparator signal input
HFREF	comparator common-mode input
IOL	Left channel current output
IOR	Right channel current output
IREF	Reference current output
ISLICE	current feedback from data slicer
LDON	Laser drive on
MISC	general purpose DAC output
MOTO1	motor output 1
MOTO2	motor output 2
NRST	Reset input
OTD	Off track detector
PORE	power-on reset enable input(active low)
R1-R2	Satellite diode signal input
RA	Radial actuator output
RAB	interface R/W and acknowledge input
RAD+	+Connection of radial actuator
RAD-	Ground connection of radial actuator
SCLK	serial bit clock output
SICL	Serial interface clock
SIDA	Serial interface data
SILD	Serial interface load
SL OUT	+Connection of sledge motor
SL	Sledge output
TEST1	test input
TEST2	test input
TS1-TS2	Test inputs
V1-5	Versatile input pins
WCLK	Word clock output
WS	Word select input of CC-DAC TDA1545
XTLI	Oscillator input
XTLO	Oscillator output
XTLR	Oscillator reference

DIODES

6360	4822 130 30621	1N4148
6361	4822 130 30621	1N4148
6400	4822 130 30613	BAW62
6401	4822 130 30613	BAW62
6402	4822 130 30613	BAW62
6500	4822 130 31981	BZX79-C3V9
6535	5322 130 30684	1N4002GP
6536	5322 130 30684	1N4002GP
6537	5322 130 30684	1N4002GP
6538	5322 130 30684	1N4002GP
6540	5322 130 30684	1N4002GP
6541	4822 130 34278	BZX79-C6V8
6542	4822 130 30621	1N4148
6543	5322 130 30684	1N4002GP
6544	4822 130 30621	1N4148
6560	5322 130 30684	1N4002GP
6561	5322 130 30684	1N4002GP
6562	4822 130 31981	BZX79-C3V9

TRANSISTORS & IC'S

7000	4822 209 31064	TDA1301T/N1
7040	4822 130 40902	BF240
7041	4822 130 40937	BC548B
7042	4822 130 44197	BC558B
7043	4822 130 40937	BC548B
7044	4822 130 40937	BC548B
7060	4822 209 72587	TCA0372
7061	4822 209 72587	TCA0372
7100	4822 209 33166	SAA7345GP/M2A
7280	4822 209 33164	TDA1545AT/N2
7300	4822 209 83274	NJM4560D
7360	4822 130 44121	BC338
7361	4822 130 44121	BC338
7362	4822 130 44121	BC338
7363	4822 130 44121	BC338
7364	4822 130 44197	BC558B
7365	4822 130 44197	BC558B
7370	4822 209 82362	NJM4556D
7400	4822 209 30249	TMP47C212AN
7500	4822 130 44197	BC558B
7535 ▲	4822 209 80891	MC7805CT
7540	5322 209 62115	MC79L15AC
7541	4822 130 40937	BC548B
7542	4822 130 44121	BC338
7543	4822 130 44197	BC558B
7600	4822 209 72587	TCA0372
7650	4822 130 44197	BC558B
7700	4822 209 33249	MC68HC11ER20/P159-07

MAINS VOLTAGE

5500 ▲	4822 146 31337	MAINS TRANSFO /00B
5500 ▲	4822 146 31339	MAINS TRANSFO /05B
5500 ▲	4822 146 31338	MAINS TRANSFO /01B

PHILIPS

SI Wichtig für die Werkstatt!

Nummer: 52139

Sachgebiet: AC 52 CD

Datum: 30.09.1994

Service Information

Betrifft: CD-Spieler CD710/CD720
Service-Hinweise

Verteiler:
INTERN und EXTERN

---

1. Fokusfehler
   Durch das Zusammenwirken von Eigenschaften des Laufwerkes CDM12.1 und des Servo-IC TDA1301 kann es bei einem ganz besonderen Plattenfehler ("white dropout" mit einer Dauer von ca. 100µs) zum Aussetzen der Fokussierung kommen, obwohl CD's mit diesem Fehler noch dem Standard entsprechen.
   Zur Verbesserung der Fokusfunktion in solchen Fällen wird den beiden Photodioden D2 und D3 ein kleiner Offset-Strom zugeführt. Dazu sind am Servo-IC TDA1301 je ein Widerstand 3M9 von Pin 4 (VRH) nach Pin 5 und nach Pin 6 zugefügt worden.

   Widerstand 3M9 4822 050 23905

2. Resetfunktion
   Zur Verbesserung der Resetfunktion bei höheren Umgebungstemperaturen ist ab Woche 9425 der Resetpegel von 4V auf 4.5V erhöht worden durch Ändern des Widerstandes 3500 (Service Manual S.27; Decoderschaltbild).

   3500 (560E) geändert in 150E 4822 116 52211

3. Decoder-IC
   In Geräten aus Fertigung ab Woche 9420 ist das Decoder-IC 7100 (SAA7345GP/M2A) ersetzt worden durch SAA7345GP/M5.
   Die beiden Ausführungen sind n i c h t k o m p a t i b e l !

   Mit der Einführung der .../M5-Version ist die Oszillator-Beschaltung des Decoder-IC geändert worden:
   - R3117 (330E) ersetzt durch Drahtbrücke
   - C2112 hinzugefügt von Pin 13/7100 nach Masse
     C2112 22pF 4822 122 33191
   - Resonator 1101 ersetzt durch eine andere Ausführung mit abweichender interner Kapazität
     1101 16.93MHz 4822 242 81865

   Bei Ersatz des Decoder-IC 7100 ist auf die verwendete Ausführung zu achten; beide Versionen sind verfügbar:
   7100 SAA7345GP/M2A 4822 209 33166
   7100 SAA7345GP/M5 4822 209 33339

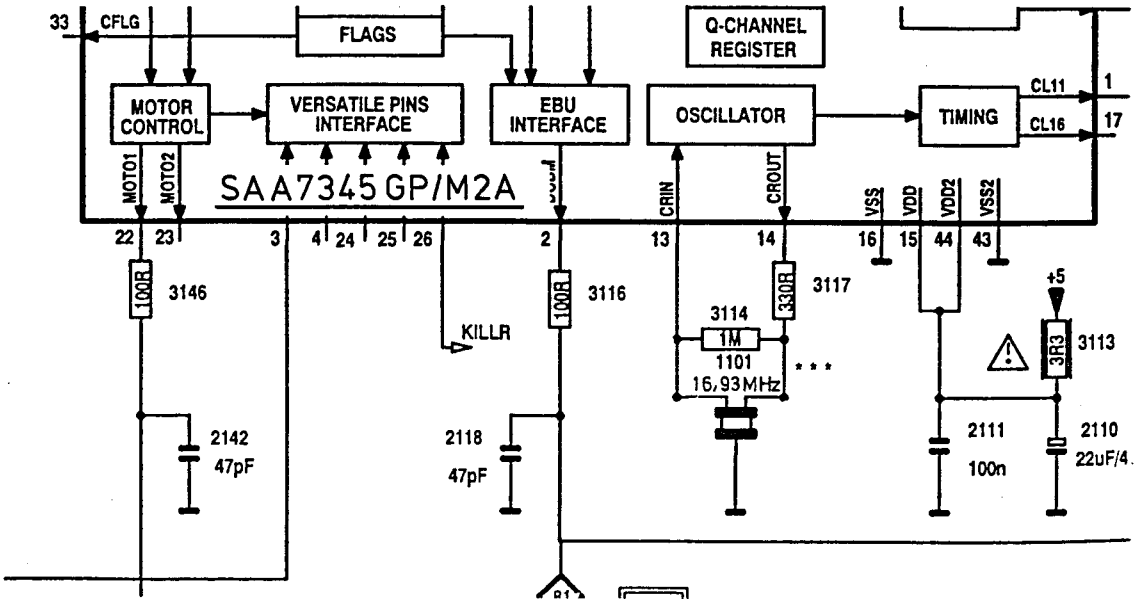
Form 80048

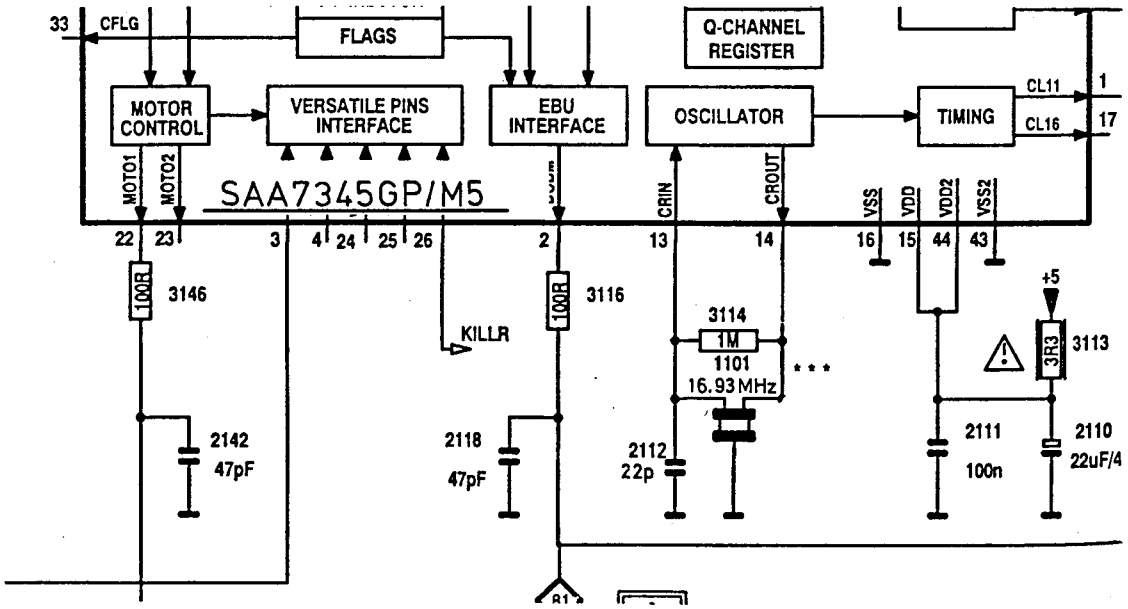
Service
Service
Service

Philips GmbH · Geschäftsbereich Service · Hamburg

Nachdruck nicht gestattet! Änderungen vorbehalten.

Soll eine IC-Version durch die andere ersetzt werden, dann muß die Oszillator-Beschaltung angepaßt werden (s. Abb.).





4. Netzteil
Von Beginn der Fertigung an ist als Diode 6540 (Service Manual, S.25) nicht der Typ 1N4002 sondern 1N4004 verwendet worden.

6540 1N4004 4822 130 83362

5. HF-Verstärker
Von Beginn der Fertigung an ist der Wert des Kondensators 2050 (Service Manual, S.26) nicht 330pF sondern 220pF.

2050 220pF 4822 122 10466

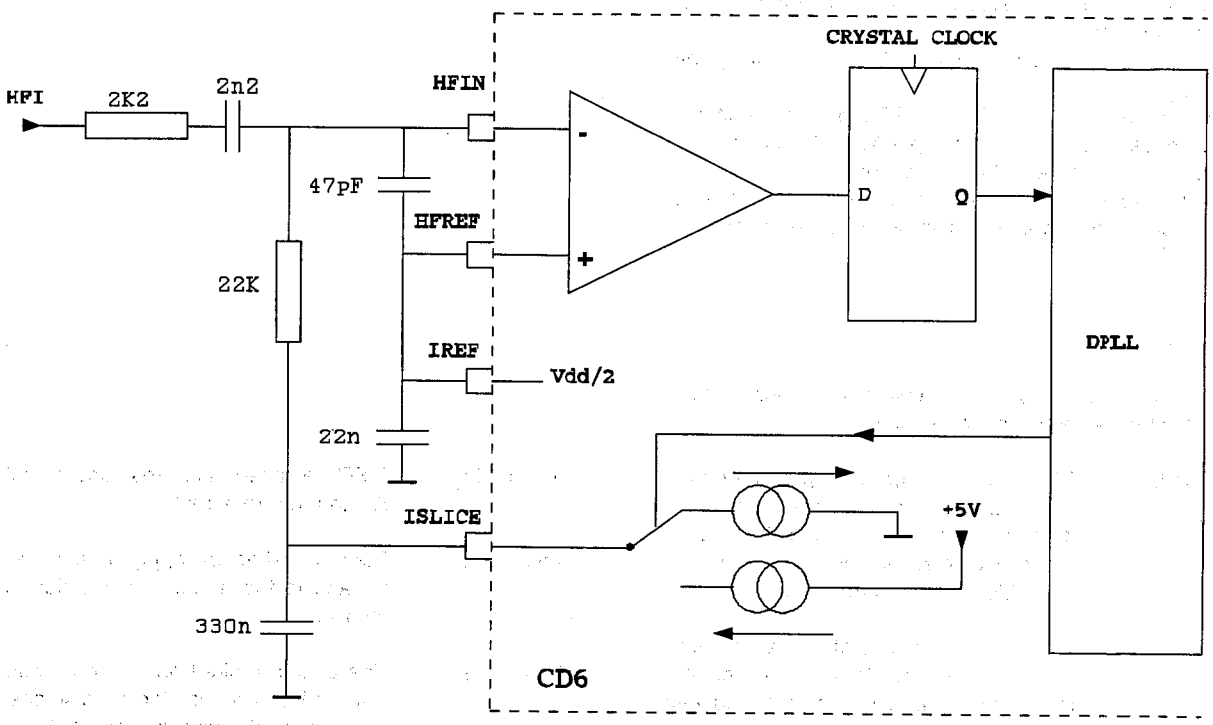
3.4. Functional description

3.4.1. Front-end

Data slicer

The SAA7345 has an integrated slice level comparator which is clocked by the crystal frequency clock.

The slice level is controlled by an internal current source applied to an external capacitor under the control of the digital phase-locked loop(DPLL).



Digital PLL

Regeneration of the bit clock is achieved with an internal fully digital PLL. No external components are required and the bit clock is not output. The PLL has two microprocessor control registers(addresses 1000 and 1001) for bandwidth and equalization.

An offtrack input(OTD) is input via the V1 pin (pin3) of the versatile pins interface. When this flag is HIGH, the SAA7345 will assume that the servo is following on the wrong track, and will flag all incoming HF data as incorrect.

Error corrector

The error corrector carries out t=2, e=0 error corrections on both C1(32 symbol) and C2(28 symbol) frames. Four symbols are used from each frame as parity symbols. The strategy t=2, e=0 means that the error corrector can correct two erroneous symbols per frame and detect all erroneous frames.
The error corrector also contains a flag processor. Flags are assigned to symbols when the error corrector cannot ascertain if the symbols are definitely good. C1 generates output flags which are read (after de-interleving) by C2, to help in the generation of C2 output flags.

The C2 output flags are used by the interpolator for concealment of uncorrectable errors. They are also output via the EBU signal(DOBM) and the MISC output with I^2S for CD-ROM applications.
The flags output pin CFLG provides information on the state of all error correction and concealment flags.
In comparison with CD4+, CD6 has a better error corrector. The error correction performance of CD6 depends on which crystal is used and on which speed is performed. The best performance is
achieved with a 33.9 MHz crystal at single speed.

3.4.2. Turntable motor control

The turntable motor speed is controlled by a fully integrated digital servo. Address information from the internal + 8 frame FIFO and disc speed information are used to calculate the motor control output signals.

Several output modes are supported:
1. Pulse Density Modulation, 2-line(true complement output), 1MHz sample frequency.
2. PWM output, 2-line, 22.05 kHz modulation frequency.
3. PWM output, 4-line, 22.05 kHz modulation frequency.
4. CDV motor mode.

The modes are selected via the motor output configuration register.
In this application, the single-ended PDM mode is used.
In this mode, the motor output pin MOTO1 contains an accelerating as well as a braking action.
50% duty cycle corresponds with the motor not actuated, higher duty cycles mean acceleration, lower mean braking.

Operation modes

The motor servo has the following operation modes controlled by the motor mode register.

Start mode 1	Disc is accelerated by applying a positive voltage to the spindle motor. No decisions are involved and the PLL is reset. No disc speed information is available for the microprocessor.
Start mode 2	The disc is accelerated as in Start mode 1, however th PLL will monitor the disc speed. When the disc reaches 75% of its nominal speed, the controller will switch to Jump mode.
Jump mode	Motor servo enabled but FIFO kept rest at 50%. The audio is muted but it is possible to read the subcode.
Jump mode 1	Similar to Jump mode but motor integrator is kept at zero. Used for long jumps.
Play mode	FIFO released after resetting to 50%. Audio mute released.
Stop mode 1	Disc is braked by applying a negative voltage to the motor. No decisions are involved.
Stop mode 2	The disc is braked as in Stop mode 1, but the PLL will monitor the disc speed. As soon as the disc reaches 12% of its nominal speed, the MOTSTOP status signal will go HIGH and switch servo to Off mode.
Off mode	Motor is not steered.

3.4.3. Audio functions

De-emphasis and phase linearity

When de-emphasis is detected in the Q-channel subcode, the digital filter automatically includes a de-emphasis filter section.

When de-emphasis is not required, a phase compensation filter section controls the phase linearity of the digital oversampling filter to ≤ ± 1° within the band 0 to 16 kHz.

Digital oversampling filter

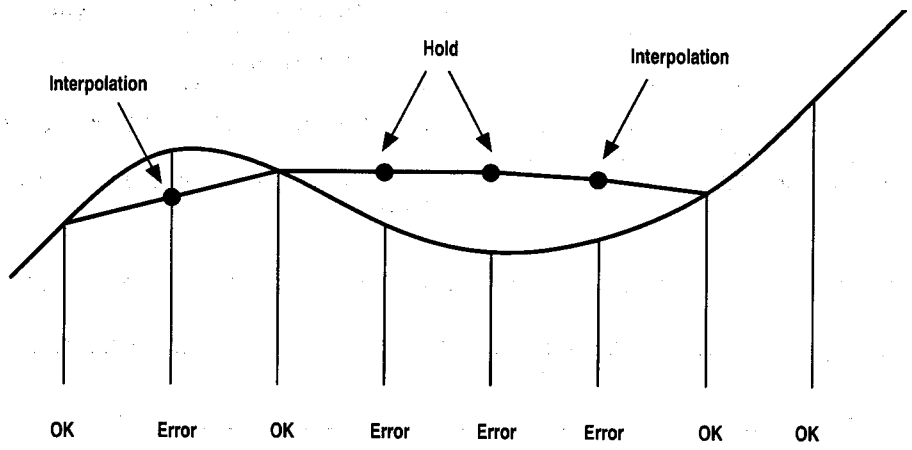
The SAA7345 contains a 2-4 times oversampling IIR filter. This means that the impulse response of this filter is infinite.

The advantage of using an IIR filter is that it is easy and cheap to implement on a chip. The main disadvantage is that is inherently not phase linear.

Concealment

A 1-sample linear interpolator becomes active if a single sample is flagged as erroneous but cannot be corrected. The erroneous sample is replaced by a level midway between the preceding and following samples. Left and right channels have independent interpolators.

If more than one consecutive uncorrectable sample is found, the last good sample is held.
A 1-sample linear interpolation is then performed before the next good sample.



Concealment mechanism

Mute, Attenuation and Fade

A digital level controller is present on the SAA7345 which performs the functions of soft mute, attenuation and fade. All these functions are software programmable.
Soft mute is activated by sending the Mute command to the fade control register, attenuation(-12dB) is activated by sending the Attenuate command. Attenuation and mute are cancelled by sending the full scale command.
The audio output is determined by the value of the internal fade counter.

$$\text{Level} = \frac{\text{counter}}{128} \times \text{maximum level}$$

The counter is preset to 128 by the Full scale command if no oversampling is required.
The counter is preset to 120(-0.5dB scaling) by the Full scale command if either 2 or 4 fs oversampling is programmed in the DAC output register.
The counter is preset to 32 by the Attenuate command.
The counter is preset to 0 by the Mute command.
To control the fade counter in a continuous way, the step-up and step-down commands are available. They will increment or decrement the counter by 1 for each register write operation.

Serial data interface

SAA7345 can be used in the CD-ROM mode, in fs (= no oversampling), in 2 fs or in 4fs (= 4 times oversampled) mode by programming the corresponding register.

Also the DAC output format can be programmed (Japanese 16 or 18 bit or Philips 16 bit). There are 10 possible DAC output formats :

MODE	SAMPLE FREQ.	BITS	SCLK Mhz	Fig.	DAC type	INTER-POLATIONS
1	Fs	16	2.1	A	CD-ROM	NO
2	Fs	16	2.1	A	Philips 16 bits	Yes
3	Fs	16	2.1	B	Japanese 16 bits	Yes
4	Fs	18	2.1	B	Japanese 18 bits	Yes
5	4Fs	16	8.5	B	Japanese 16 bits	Yes
6	4Fs	18	8.5	B	Japanese 18 bits	Yes
7	4Fs	16	8.5	A	Philips 16 bits	Yes
8	2Fs	16	4.2	B	Japanese 16 bits	Yes
9	2Fs	18	4.2	B	Japanese 18 bits	Yes
10	2Fs	16	4.2	A	Philips 16 bits	Yes

Mode 3 is used in CD750 with NPC filter SM5840A and BSDAC SAA7350. For description of NPC filter and BS DAC we refer to Circuit Description CD93 part II orderno. 4822 725 24042

Mode 5 is used in CD710/720 with CC-DAC TDA1545.

Mode 6 is used in CD740 and CD911/921 with BCC-DAC TDA1549.

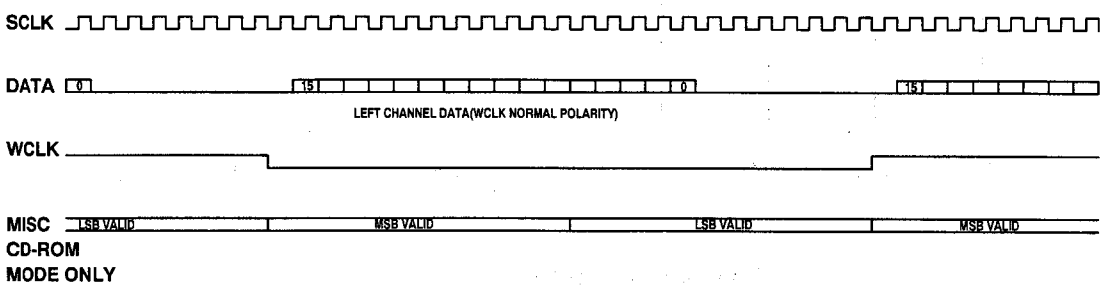


Fig. A Philips I2S data format(16-bit word length shown)

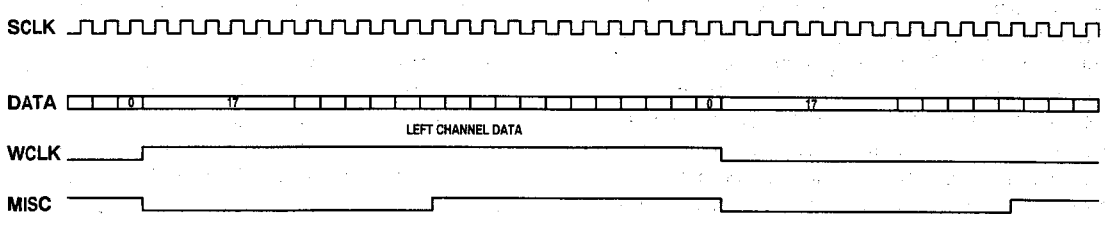


Fig. B Japanese data format(18-bit word length shown)

HAS1153

Peak detector output

In place of the CRC-bits(Cyclic Redundancy Check) 81 to 96, the peak detector information is added to the Q-channel data. The peak information corresponds to the highest audio level and is measured on positive peaks.

Digital output interface

The biphase-mark digital output signal at pin DOBM is according to the format defined by the IEC958 specification. The digital audio output consists of 32-bit words transmitted in biphase-mark code(two transitions for logic 1 and one transition for a logic 0). Left and right audio samples are transmitted alternately.

Kill circuit

The kill circuit detects digital silence by testing for an all-zero or all-ones data word in the left or right channel before the digital filter. The KILL pin 27 is active-LOW when digital selence has been detected in the LEFT channel for 200 ms, and V3 pin 26 is active-LOW when digital silence has been detected in the RIGHT channel for 200 ms.
When MUTE is active then the KILL outputs are forced LOW.

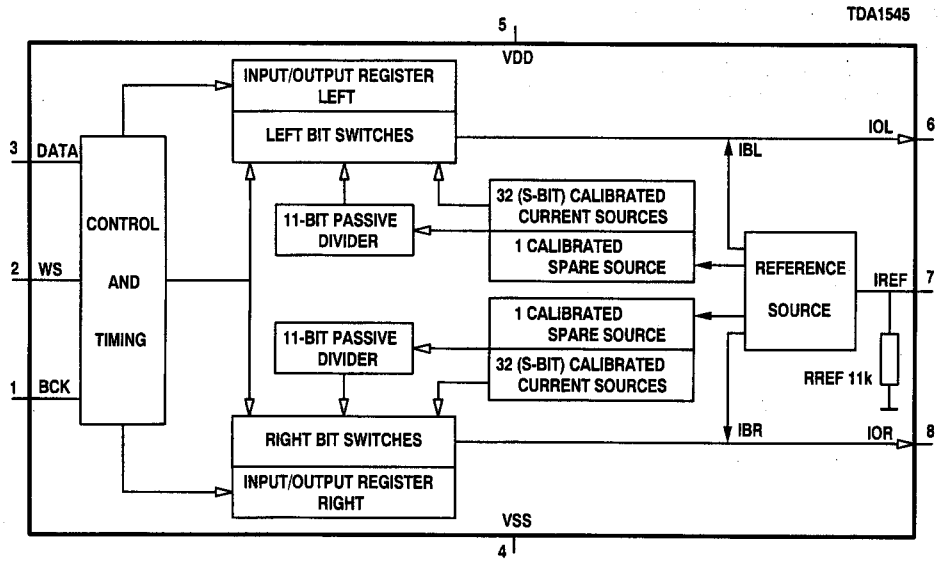
4. Stereo continuous calibration DAC TDA1545

4.1. General description

The TDA1545 is the first device of a new generation of digital-to-analog converters which embodies the innovative technique of continuous calibration. The largest bit-currents are repeatedly generated by one single current reference source.

This duplication is based upon an internal charge storage principle having an accuracy insentive to ageing, temperature and process variations.

4.2. Block diagram



HAS1154

4.3. Pin description

PIN	SYMBOL	DESCRIPTION
1	BCK	bit clock input
2	WS	word select input
3	DATA	data input
4	GND	ground
5	VDD	positive supply voltage
6	IOL	left channel output
7	IREF	reference current input
8	IOR	right channel output

5.4. Functional description

General

The TDA1549 CMOS D/A bitstream continuous calibration converter incorporates internal digital filtering which increases the oversampling rate of 4fs input data to 96fs, and removes the spectral data components around 4fs, 8fs and 12fs.

A second-order noise shaper operating at 96fs outputs a five-bit data bitstream to the D/A converters. The filtering required for waveform smoothing and out-of-band noise reduction is achieved by simple first-order analog post-filtering.

Input

The circuit accepts four times oversampled data in 18-bit 2's complement standard Japanese format with MSB first. Left and right data-channel words are time multiplexed.

The bit clock(BCK) operates at 192fs i.e. 48 times the word select(WS) frequency of 4fs.

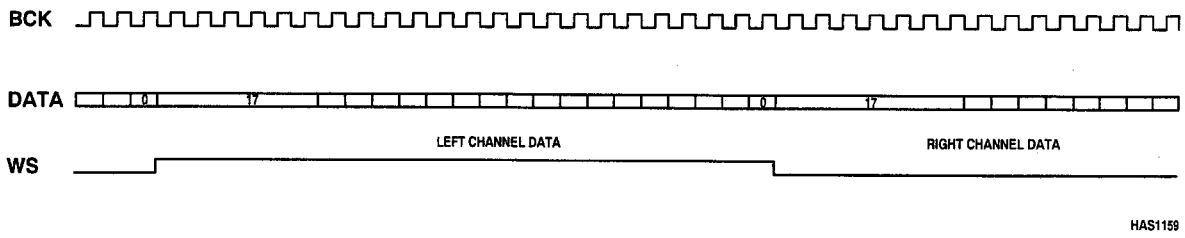


fig 5.1 : Input format

Oversampling filter

The oversampling filter consists of:

- A seventh order halfband low pass FIR filter which increases the oversampling rate from 4 times to 8 times. This removes the spectral components around 4fs and 12fs.
- A linear interpolation section which increases the oversampling rate to 16 times. This removes the spectral components around 8fs.
- A sample and hold section which provides another 6 times oversampling to 96 times. The zero-order hold characteristic of this sample and hold section plus the first order analog filtering remove the spectral components around 16fs.

The passband ripple is within 0.1dB. The stopband attenuation is >50dB around multiples of the sampling frequency.

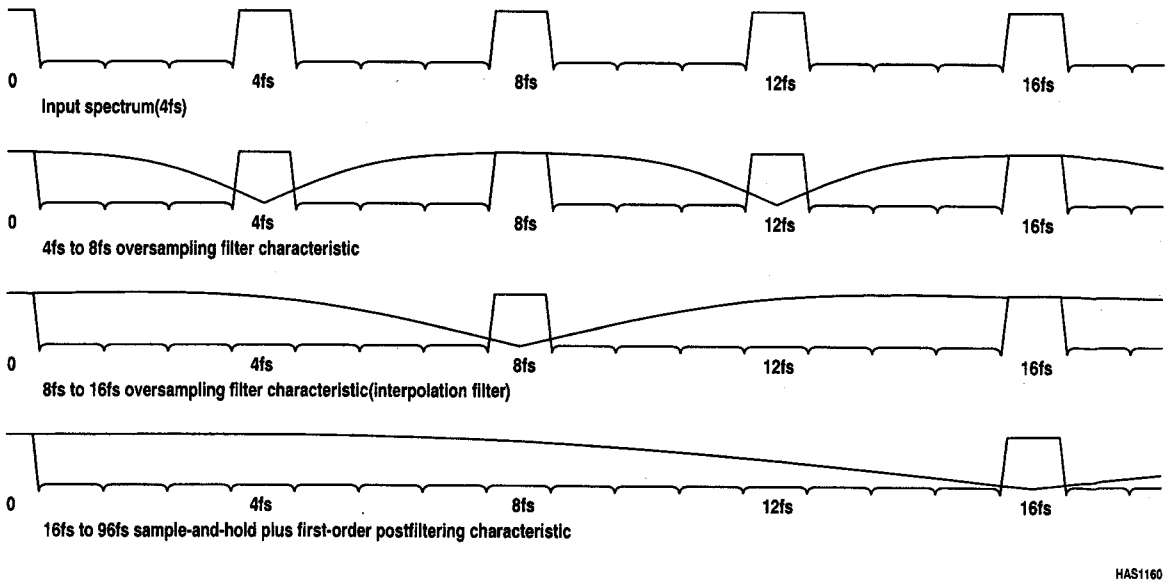


Fig 5.2 : Filter and noise shaper characteristics

Noise shaper

The 2nd-order digital noise shaper converts the 18bit data at 96fs into a 5-bit bitstream, while shifting in-band quantisation noise to frequencies well above the audio band. For low sinal levels the noise shaper output is a one-bitstream. This noise shaping technique used in combination with a special data code and bitstream converter enables extremely high signal-to-noise ratios to be achieved.

Data encoder

The data encoder converts the five-bit 2's complement output data from the noise shaper to a 32-bit thermometer code.
In traditional unidirectional current converters, half the full-scale current flows to the output during small signal reproduction. The thermal noise and substrate crosstalk components, present in this current, severely restrict the dynamic range which can be attained. In this BCC-DAC true low-noise performance is achieved using a special data code and bidirectional current sources. The special data code guarantees that only small values of current flow to the output during small-signal passages while larger positive or negative signals are generated using the bidirectional sources. Furthermore, for every change in the 18 bit input sample only one current source or current sink is switched on. This intrinsically monotonic thermometer code ensures the high differential linearity, zero crossover distortion and superior signal-to-noise ratio associated with bitstream conversion.

Continuous Calibration D/A converter.

The DAC currents(16 sources and 16 sinks) of each channel are repeatedly generated from one single reference current. See description of CC-DAC TDA1545.

Operational amplifiers

High precision, low-noise amplifiers together with the internal conversion resistors RCONV1 and RCONV2 convert the converter output current to a voltage capable of driving a line output. This voltage is available at VOL and VOR(1.5Vrms typical). Connecting external capacitors CEXT1 and CEXT2 between resp. IOL and VOL, IOR and VOR provides the required first order postfiltering for the left and right channels. The RC combinations determine the first-order fall-off frequencies.

Internal reference circuitry

Internal reference circuitry ensures that the output voltage signal is proportional to the supply voltage, thereby maintaining maximum dynamic range for supply voltages from 3.4 to 5.5V.